Technical Writing

Feb. 28, 2019

Does Writing Come Easy?

- Writing and talking are different.

- Writing takes practice.

- Some people suffer writer's block.

    Professors as Writers: A Self-Help Guide

    Robert Boice Publisher New Forums

- My view: the more routine you make it, the easier it becomes.

General Strategy

Know who is your audience

- Experts in your field/subfield
- PhD scientists generally familiar with your field
- Graduate students studying your field
- Program managers
- Lay people

Then pitch one notch lower

How long should the manuscript be?

Are there page, word, or character limits?

This will put constraints on the level of detail in your description.

Make an outline (Girvan)

- Organizes your thoughts and lets you better identify what else needs to be done.

- Allows you to take a step back and make sure that you're emphasizing the key points.

- Makes it easier for you to reorganize

- Makes it easier for your advisor/co-authors to give input

Do not write a chronological account of what you did.

Steps for making an outline (Girvan)

- Make a list of the key points that you want to get across in the your paper (don't worry about the order at this stage)

- Make a list of questions your reader might have about key points

- Make a list of the figures you want to include

- Make a list of the sections (e.g., intro, methods, results, discussion, etc)

- Break down each section into subsections/bullet points. Include estimates of section lengths consistent with journal requirements

- Tip: One bullet point/ subsection per paragraph is a good rule of thumb

- After you've made your outline, refine it by making sure it does the following:

    Gets across all the key points with the right emphasis

    Answers anticipated reader questions

    Provides a guide to writing your paper. Helps you ensure reproducibility.

Determine what the main point is that you'd like to convey.

- In the introduction tell them what will be the main point.

- In the body tell them the main point.

- In the conclusion tell them what was the main point.

Research Paper Organization

Abstract - Should be understandable by non-experts,
            Problem studied and its significance
            Indicate methods
            Some conclusion

Introduction –Repeat with detail what is in abstract
            Place present work in context (review)
            Highlight what will be key findings
            Outline organization of paper

Organization

Methods - How did you do what you did?
Theoretical/computational/experimental approach

Results - Processed data
Figures !!!

Discussion - Conclusion - Summarize results and significance
Indicate next steps to be taken

Acknowledgement - Which colleagues helped (not co-authors)
Who funded the research?
Loaned equipment facilities?

Pick you figures before writing results

- Often the discussion is centered on describing the figures

- Figure captions should contain all useful information

- Figure axes labels should correspond to quantities defined in text. Make sure symbols are big enough, curves are distinguishable and labeled.

More on Figures

- Figures are developed over time.

- Many iterations are required until data and trends are clear.

- Maximize information per unit area - Minimize white space.

- If data displayed has been processed, be clear about how that was done.

Paragraph Organization

Use the paragraph structure as much as possible

- Each paragraph has one main point, which is made in the first sentence of the paragraph.

- The rest of the paragraph supports that point.

  - This helps the reader know where you are going.

  - Keeps the reader focused.

Sentence Style

Make you language as simple as possible.

- New technical points are hard to understand to begin with.

- Make your sentences short and your statements direct.

- Don't use complicated sentences. Minimize modifying clauses, keep them close to what they modify.

Simple Sentence Structure

Good:

"Veni, vidi, vici" - Julius. Caesar

  (I came; I saw; I conquered. 3 sentences 3 words)

Ok, maybe too good.

Bad:

"But when individuals are simply identified with the actual order, ethical life (*das Sittliche*) appears as their general mode of conduct, i.e. as custom (*Sitte*), while the habitual practice of ethical living appears as a second nature which, put in the place of the initial, purely natural will, is the soul of custom permeating it through and through, the significance and the actuality of its existence. It is mind living and present as a world, and the substance of mind thus exists now for the first time as mind."

- Georg Wilhelm Friedrich "Say what?" Hegel
German translated to English

Be Explicit

Don't assume the reader lives inside your head.

Something that is clear to you may need to be stated explicitly.

Watch out for ambiguous pronouns.
"It's the same."   What is the same as what?

You don't want the reader to stop reading and go back to determine to what you are referring.

Even More Advice

Start writing well before the deadline.

- Gives you time to proof read, reread, and modify your text.

- It's best to let a day or two pass between your initial writing and your rewriting.

- This allows you to see what you wrote more as a reader would and less as the author who already understands everything.

Technical Specifics

Define every symbol at the time it first appears.

Define your terms – even if you think they should be clear.

Write out each acronym the first time it appears.

"Our ACA cards came in the mail."
Affordable Care Act or American Canoe Association?

Don't be condescending

Don't use terms such as:

 "trivial", "obvious", "easy to show", "well known" .

 - unless your coauthor is Sheldon Cooper.

Avoid slang

You are writing a scholarly paper, get serious.

Syntax and Grammar

Check that subject and verb match,

- not just singular and plural.

Can the subject actually do the predicate?

The statistical energy analysis (SEA) assumes energy equipartition to predict the average distribution of vibro-acoustic energy in complex built-up structures.

What's not quite right ?

Examples, can you fix these?

Table.1 gives us a pretty good idea of how to maximize the device efficiency while keeping the grid-less tetrode as compact as possible.

Therefore it is quite easy for us to conclude that it is the influence of the secondary electrons which changes the maximum RF voltage.

Several years ago the Air Force Office of Scientific Research (AFOSR) started a new program aimed at studying some possibilities to develop transportable ionospheric heating facilities capable of more efficient ionospheric modifications than existing stationary facilities located, as a rule, at high altitudes (see, e.g., [1,2] and references therein).

At present, there are no available RF sources with such parameters: the sources used at HAARP are the gridded triodes of much lower power level, which cannot be scaled to required power levels because of the restrictions imposed by the thermal management of grids intercepting some electrons of an electron beam.

Mr/Ms/Dr Grammar Person

How to make parallel constructions.

When to use compose and comprise ?

When to use compare with and compare to ?

When to use affect or effect ?

When to use ensure, insure, or assure?

How to make parallel constructions

Lists of items should be the same parts of speech, and of similar complexity.

The key to success is hard work and being lucky.   (NG)

The key to success is hard work and good luck.   (OK)

The key to success is working hard and being lucky. (OK)

The key to success is hard work, which will wear you down eventually if you reach age 68, and good luck.   (NG)

Comprise/Compose

The whole comprises the parts.

    The college comprises eight departments.

The parts compose the whole.

    Eight department compose the college.

Avoid "is comprised of".

"Compare with" vs "Compare to"

"Compare with"
    To put two things side by side to examine their similarities and differences.

Data from Experiment A can be compared with that of Experiment B.

"Compared to"
    To take things that are perceived as different and relate them.

The Chair of the department can be compared to the Captain of the Titanic.

Affect / Effect

Affect is a verb (unless you're talking about someone's appearance).

Effect is a noun.

The positions of the constellations at the time of your birth affect your chances of getting a tenured position.

The effect of concentrated "Fortnight" engagement is to improve your dance moves.

Assure/Ensure/Insure

Assure: to offer personal opinion that something will or will not happen.

Ensure: to take care that something will or will not happen.

Insure: to offer recompense if something does or doesn't happen.

When to use the Oxford Comma

In a list of items A, B, and C. The comma before "and" is the Oxford Comma

My heroes are my parents, Superman and Wonder Woman.

or

My heroes are my parents, Superman, and Wonder Woman.

NY Times: *Oxford Comma Dispute Is Settled as Maine Drivers Get $5 Million*

By <u>Daniel Victor,</u> Feb. 9, 2018

Ending a case that electrified punctuation pedants, grammar goons and comma connoisseurs, Oakhurst Dairy settled an overtime dispute with its drivers that hinged entirely on the lack of an Oxford comma in state law.

The dairy company in Portland, Me., agreed to pay $5 million to the drivers, according to court documents filed on Thursday. ....

The case began in 2014, when three truck drivers sued the dairy for what they said was four years' worth of overtime pay they had been denied. Maine law requires time-and-a-half pay for each hour worked after 40 hours, but it carved out exemptions for:

The canning, processing, preserving, freezing, drying, marketing, storing, packing for shipment or distribution of:

(1) Agricultural produce;

(2) Meat and fish products; and

(3) Perishable foods.

What followed the last comma in the first sentence was the crux of the matter: "packing for shipment or distribution of." The court ruled that it was not clear whether the law exempted the distribution of the three categories that followed, or if it exempted packing for the shipment or distribution of them.